



results of **BLAST**

BLASTP 2.2.6 [Apr-09-2003]

RID: 1064601845-5875-417649.BLASTQ3

Query=

(89 letters)

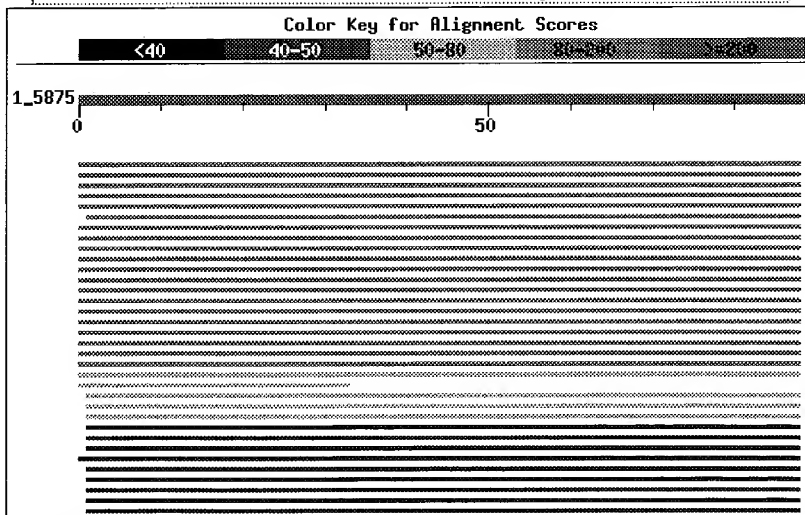
Database: All non-redundant GenBank CDS
translations+PDB+SwissProt+PIR+PRF

1,538,680 sequences; 497,353,198 total letters

Taxonomy reports

Distribution of 36 Blast Hits on the Query Sequence





























Mouse-over to show define and scores. Click to show alignments



Sequences producing significant alignments:

Score E
(bits) Value

gi 3342090 gb AAC27510.1 	gastrin\cholecystokinin brain rec...	165	1e-40
gi 30584635 gb AAP36570.1 	Homo sapiens cholecystokinin B r...	160	4e-39
gi 28875799 ref NP_795344.1 	cholecystokinin B receptor; CC...	160	4e-39
gi 1220299 gb AAA91831.1 	cholecystokinin B receptor	159	1e-38
gi 7690036 gb AAB30766.2 	cholecystokinin B receptor [Homo ...	159	1e-38
gi 440912 gb AAB28625.1 	cholecystokinin B/gastrin receptor...	134	3e-31


gi 15911833 gb AAK38351.1 	CCK-B/gastrin receptor variant [...]	129	9e-30	
gi 7677460 gb AAF67174.1 AF239668.1	CCK-B/gastrin receptor ...	129	1e-29	
gi 27806271 ref NP_776687.1 	cholecystokinin B receptor; CC...	120	4e-27	
gi 1169841 sp P46627 GASR_RABIT	Gastrin/cholecystokinin typ...	119	1e-26	
gi 26343361 dbj BAC35337.1 	unnamed protein product [Mus mu...	107	4e-23	
gi 7106265 ref NP_031653.1 	cholecystokinin B receptor; CCK...	107	5e-23	
gi 2654390 gb AAB87706.1 	gastrin/CCK-B receptor [Canis fam...	104	3e-22	
gi 232131 sp P30552 GASR_CANFA	Gastrin/cholecystokinin type...	104	3e-22	
gi 399533 sp P30796 GASR_PRANA	Gastrin/cholecystokinin type...	102	2e-21	
gi 1813461 gb AAB41677.1 	gastrin/cholecystokinin-B receptor	101	3e-21	
gi 1813459 gb AAB41676.1 	gastrin/cholecystokinin receptor	100	8e-21	
gi 1813447 gb AAB41829.1 	gastrin/cholecystokinin receptor	98	3e-20	
gi 6978617 ref NP_037297.1 	cholecystokinin B receptor; CCK...	96	1e-19	
gi 1083622 pir S48049	cholecystokinin B receptor - rat (fr...	92	2e-18	
gi 2495001 sp P70031 CCKR_XENLA	Cholecystokinin receptor (C...	62	2e-09	
gi 26333421 dbj BAC30428.1 	unnamed protein product [Mus mu...	52	2e-06	
gi 2495000 sp Q63931 CCKR_CAVPO	Cholecystokinin type A rece...	52	3e-06	
gi 739858 prf I2004206A	cholecystokinin A receptor	51	3e-06	
gi 6978615 ref NP_036820.1 	cholecystokinin A receptor [Rat...	51	4e-06	
gi 1582179 prf I2118221A	cholecystokinin A receptor	50	1e-05	
gi 4502607 ref NP_000721.1 	cholecystokinin A receptor [Hom...	50	1e-05	
gi 2541920 dbj BAA22847.1 	cholecystokinin type-A receptor ...	49	1e-05	
gi 32400155 emb CAD33800.1 	cholecystokinin receptor [Gallu...	47	7e-05	
gi 12836122 dbj BAB23512.1 	unnamed protein product [Mus mu...	46	1e-04	
gi 6753306 ref NP_033957.1 	cholecystokinin A receptor [Mus...	46	1e-04	
gi 18088214 gb AAH20534.1 	cholecystokinin A receptor [Mus ...	46	1e-04	
gi 1083155 pir S50150	gastric CCK-A receptor - rabbit >gi ...	43	0.001	
gi 10719928 sp O97772 CCKR_RABIT	Cholecystokinin type A rec...	42	0.003	

Alignments

Get selected sequences

Select all

Deselect all


 >[gi|3342090|gb|AAC27510.1|](#) gastrin\cholecystokinin brain receptor [Homo sapiens]
Length = 396

Score = 165 bits (418), Expect = 1e-40

Identities = 89/91 (97%), Positives = 89/91 (97%), Gaps = 2/91 (2%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 58
RELYLGLRF DSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP
Sbjct: 192 RELYLGLRFDGSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 251

Query: 59 ALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
ALELTALTAPGPGSGSRPTQAKLLAKKRVVR
Sbjct: 252 ALELTALTAPGPGSGSRPTQAKLLAKKRVVR 282

 >[gi|30584635|gb|AAP36570.1|](#) Homo sapiens cholecystokinin B receptor [synthetic c]
Length = 448

Score = 160 bits (406), Expect = 4e-39
Identities = 89/91 (97%), Positives = 89/91 (97%), Gaps = 2/91 (2%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 58
RELYLGLRF DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP
Sbjct: 243 RELYLGLRFDGSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 302

Query: 59 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
ALELTALTAPGPGSGSRPTQAKLLAKKRVR
Sbjct: 303 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 333

[gi|28875799|ref|NP_795344.1|](#) cholecystokinin B receptor; CCK2 receptor; gastr
sapiens]

[gi|417029|sp|P32239|GASR_HUMAN](#) Gastrin/cholecystokinin type B receptor (CCK-B r
[gi|476975|pir|A47430](#) gastrin/cholecystokinin receptor B, short splice form - hum
[gi|179998|qb|AAA35660.1|](#) cholecystokinin receptor
[gi|306489|qb|AAA35657.1|](#) cholecystokinin-B/gastrin receptor
[gi|406076|qb|AAC37528.1|](#) gastrin receptor
[gi|436040|dbj|BAA02564.1|](#) cholecystokinin receptor [Homo sapiens]
[gi|12653895|gb|AAH00740.1|](#) Cholecystokinin B receptor [Homo sapiens]
[gi|28316421|dbj|BAA04759.2|](#) cholecystokinin-B receptor/gastrin receptor [Homo sap
[gi|30582417|qb|AAP35435.1|](#) cholecystokinin B receptor [Homo sapiens]
[gi|32482023|qb|AAP84364.1|](#) cholecystokinin B receptor [Homo sapiens]
Length = 447

Score = 160 bits (405), Expect = 4e-39
Identities = 89/91 (97%), Positives = 89/91 (97%), Gaps = 2/91 (2%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 58
RELYLGLRF DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP
Sbjct: 243 RELYLGLRFDGSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 302



Query: 59 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
ALELTALTAPGPGSGSRPTQAKLLAKKRVR
Sbjct: 303 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 333

[gi|1220299|qb|AAA91831.1|](#) cholecystokinin B receptor
Length = 447

Score = 159 bits (401), Expect = 1e-38
Identities = 88/91 (96%), Positives = 89/91 (97%), Gaps = 2/91 (2%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 58
RELYLG+RF DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP
Sbjct: 243 RELYLGVRFDGSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 302




Query: 59 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
ALELTALTAPGPGSGSRPTQAKLLAKKRVR
Sbjct: 303 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 333

 >gi|7690036|gb|AAB30766.2|  cholecystokinin B receptor [Homo sapiens]
Length = 447

Score = 159 bits (401), Expect = 1e-38
Identities = 88/91 (96%), Positives = 89/91 (97%), Gaps = 2/91 (2%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRP 58
RELYLGLRF DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVG+DSDGCVVQLPRSRP
Sbjct: 243 RELYLGLRFDGSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGKSDGCVVQLPRSRP 302




Query: 59 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
ALELTALTAPGPGSGSRPTQAKLLAKKRVR
Sbjct: 303 ALELTALTAPGPGSGSRPTQAKLLAKKRVR 333

 >gi|440912|gb|AAB28625.1|  cholecystokinin B/gastrin receptor, CCKB/gastrin recep
cytoplasmic domain] [human, small cell lung cancer,
Peptide PartialMutant, 90 aa]
gi|440913|gb|AAB28626.1|  cholecystokinin B/gastrin receptor, CCKB/gastrin recepto
cytoplasmic domain] [human, Peptide Partial, 90 aa]
Length = 90

Score = 134 bits (337), Expect = 3e-31
Identities = 88/90 (97%), Positives = 88/90 (97%), Gaps = 2/90 (2%)

Query: 2 ELYLGLRF--DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPA 59
ELYLGLRF DSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPA
Sbjct: 1 ELYLGLRFDGSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPA 60

Query: 60 LETALTAPGPGSGSRPTQAKLLAKKRVR 89
LELTALTAPGPGSGSRPTQAKLLAKKRVR
Sbjct: 61 LETALTAPGPGSGSRPTQAKLLAKKRVR 90

 >gi|15911833|gb|AAK38351.1|  CCK-B/gastrin receptor variant [Homo sapiens]
gi|23451715|gb|AAN32829.1|AF441129.1  cholecystokinin-C receptor [Homo sapiens]
Length = 516

Score = 129 bits (325), Expect = 9e-30
Identities = 63/63 (100%), Positives = 63/63 (100%)

Query: 27 GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR 86
GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR
Sbjct: 340 GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR 399

Query: 87 VVR 89
VVR
Sbjct: 400 VVR 402

Score = 35.4 bits (80), Expect = 0.21
Identities = 27/29 (93%), Positives = 27/29 (93%), Gaps = 2/29 (6%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPG 27
RELYLGLRF DSDSDSQSRVRNQGGLPG
Sbjct: 243 RELYLGLRFDGSDSDSQSRVRNQGGLPG 271

>gi|7677460|gb|AAF67174.1|AF239668.1 CCK-B/gastrin receptor [Homo sapiens]
Length = 516

Score = 129 bits (324), Expect = 1e-29
Identities = 63/63 (100%), Positives = 63/63 (100%)

Query: 27 GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR 86
GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR
Sbjct: 340 GAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALELTALTAPGPGSGSRPTQAKLLAKKR 399
Query: 87 VVR 89
VVR
Sbjct: 400 VVR 402

Score = 35.4 bits (80), Expect = 0.21
Identities = 27/29 (93%), Positives = 27/29 (93%), Gaps = 2/29 (6%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGGLPG 27
RELYLGLRF DSDSDSQSRVRNQGGGLPG
Sbjct: 243 RELYLGLRFDGSDSDSQSRVRNQGGGLPG 271

>gi|27806271|ref|NP_776687.1| cholecystokinin B receptor; CCK2 receptor [Bos t
gi|3023830|sp|P79266|GASR_BOVIN Gastrin/cholecystokinin type B receptor (CCK-B re
gi|1836140|gb|AAB46896.1| cholecystokinin B-gastrin receptor; CCKB-gastrin rece
taurus]
gi|1588667|prf|I2209271A cholecystokinin-B/gastrin receptor
Length = 454

Score = 120 bits (302), Expect = 4e-27
Identities = 67/98 (68%), Positives = 72/98 (73%), Gaps = 9/98 (9%)

Query: 1 RELYLGLRFDSDSDSQSRVR-----NQGGGLPGAVHQNGRCRPETGAVGEDSDGCVVQL 53
RELYLGLRFD DSDS+S+ R G G NGRCR ET GED DGCYVQL
Sbjct: 243 RELYLGLRFDGSDSDSESQSRVGSQGGLPGGTGQGPQAQNGRCRSETRLAGEDGDGCVVQL 302

Query: 54 PRSRPALELTALTA--PGPGSGSRPTQAKLLAKKRVRVVR 89
PRSRPALE++ALTA PGPGSG+RP QAKLLAKKRVRVVR
Sbjct: 303 PRSRPALEMSALTAPTGPBGSGTRPAQAKLLAKKRVRVVR 340

>gi|1169841|sp|P46627|GASR_RABIT Gastrin/cholecystokinin type B receptor (CCK-B
gi|1083156|pir|JC2459 gastrin/cholecystokinin B receptor - rabbit
gi|495665|gb|AAA31194.1| gastrin
Length = 452

Score = 119 bits (297), Expect = 1e-26
Identities = 76/98 (77%), Positives = 78/98 (79%), Gaps = 9/98 (9%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQ----GGLPGAVHQNGRCRPETGAVGEDSDGCVVQL 53
RELYLGLRF DSDS+SQSRVR Q G PG VHQNGRCRPE G GED DGCYVQL
Sbjct: 241 RELYLGLRFDSDSDSESQSRVRGQGGLPGGAAPGPVHQNGRCRPEAGLAGEDGDGCVVQL 300

Query: 54 PRSRPALELTALTAP--GPGSGSRPTQAKLLAKKRVVR 89
 PRSRPALEL+ALTAP GPG G RP QAKLLAKKRVVR
 Sbjct: 301 PRSRPALELSALTAPISGPGGPRPAQAKLLAKKRVVR 338

>gi|26343361|dbj|BAC35337.1| unnamed protein product [Mus musculus]
 Length = 453

Score = 107 bits (267), Expect = 4e-23
 Identities = 66/97 (68%), Positives = 68/97 (70%), Gaps = 8/97 (8%)

Query: 1 RELYLGLRFDSDDSDS--QSRVRNQGGLPGA-----VHQNGRCRPETGAVGEDSDGCVVQ 52
 RELYLGLRFD D+DS QSRVRNQGGLPG VHONG CR T GEDSDGCVVQ
 Sbjct: 243 RELYLGLRFDGDNDSQTQSRVRNQGGLPGGAAAPGPVHQNGGCRHVTSLTGEDSDGCVVQ 302

Query: 53 LPSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
 LPSR + GPG G RP QAKLLAKKRVVR
 Sbjct: 303 LPSRLEMTTLTPTTGP GPGPRPNQAKLLAKKRVVR 339

>gi|7106265|ref|NP_031653.1| cholecystokinin B receptor; CCK-B/gastrin recepto
 receptor; CCK2/gastrin [Mus musculus]

gi|3023828|sp|P56481|GASR MOUSE Gastrin/cholecystokinin type B receptor (CCK-B
 gi|2460177|gb|AAB71863.1| CCK-B/gastrin receptor [Mus musculus]
 gi|9964011|gb|AAG09801.1| cholecystokinin-B receptor [Mus musculus]
 gi|26390338|dbj|BAC25881.1| unnamed protein product [Mus musculus]
 Length = 453

Score = 107 bits (267), Expect = 5e-23
 Identities = 66/97 (68%), Positives = 68/97 (70%), Gaps = 8/97 (8%)

Query: 1 RELYLGLRFDSDDSDS--QSRVRNQGGLPGA-----VHQNGRCRPETGAVGEDSDGCVVQ 52
 RELYLGLRFD D+DS QSRVRNQGGLPG VHONG CR T GEDSDGCVVQ
 Sbjct: 243 RELYLGLRFDGDNDSQTQSRVRNQGGLPGGAAAPGPVHQNGGCRHVTSLTGEDSDGCVVQ 302

Query: 53 LPSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
 LPSR + GPG G RP QAKLLAKKRVVR
 Sbjct: 303 LPSRLEMTTLTPTTGP GPGPRPNQAKLLAKKRVVR 339

>gi|2654390|gb|AAB87706.1| gastrin/CCK-B receptor [Canis familiaris]
 Length = 454

Score = 104 bits (260), Expect = 3e-22
 Identities = 67/96 (69%), Positives = 70/96 (72%), Gaps = 7/96 (7%)

Query: 1 RELYLGLRFDSDDSDSQSRVRNQ----GGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPR 55
 RELYLGLRFD DSDS+SRVR+Q G PG NG CRPE G GED DGCYVQLPR
 Sbjct: 245 RELYLGLRFDSDSSESRVRSQGGLRGGAGPGAPPNGSCRPEGLAGEDGDCYVQLPR 304

Query: 56 SRPALELTALTAPGPGSGSRPT--QAKLLAKKRVVR 89
 SR LEL+ALTAP PG G P QAKLLAKKRVVR
 Sbjct: 305 SRQTELSALTAPTGP GGGPRPYQAKLLAKKRVVR 340

gi|232131|sp|P30552|GASR_CANFA Gastrin/cholecystokinin type B receptor (CCK-B r
gi|423174|pir||S32817 gastrin receptor - dog
gi|163957|gb|AAA30847.1| gastrin receptor
 Length = 453

Score = 104 bits (260), Expect = 3e-22
 Identities = 67/96 (69%), Positives = 70/96 (72%), Gaps = 7/96 (7%)

Query: 1 RELYLGLRFDSDSDSQSRVRNQ-----GGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPR 55
 RELYLGLRFD DSDS+SRVR+Q G PG NG CRPE G GED DGCYVQLPR
 Sbjct: 244 RELYLGLRFDSDSDSESRRVSQGGGLRGAGPGFAPPNGSCRPEGGLAGEDGDGCVVQLPR 303

Query: 56 SRPALELTALTAPGPGSGSRPT--QAKLLAKKRVR 89
 SR LEL+ALTAP PG G P QAKLLAKKRVR
 Sbjct: 304 SRQTELSALTAPTGPGGGPRPYQAKLLAKKRVR 339

gi|399533|sp|P30796|GASR_PRANA Gastrin/cholecystokinin type B receptor (CCK-B r
gi|112583|pir||JQ1614 gastrin receptor - multimammate rat (Mastomys natalensis)
gi|220647|dbj|BAA02250.1| gastrin/cholecystokinin-B receptor [Mastomys natalensis]
 Length = 450

Score = 102 bits (253), Expect = 2e-21
 Identities = 65/96 (67%), Positives = 69/96 (71%), Gaps = 9/96 (9%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGA-----VHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGLRF D+DSD+QSRVRNQGGLP VHQNG CR T A GED+DGCYVQL
 Sbjct: 243 RELYLGLRFDGNDSDTQSRVRNQGGLPGGTAPGVPVHQNGGCRHVTVA-GEDNDGCVVQL 301

Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
 PRSR + PGP S QAKLLAKKRVR
 Sbjct: 302 PRSRLEMTTLTPTPGPGLAS-ANQAKLLAKKRVR 336

gi|1813461|gb|AAB41677.1| gastrin/cholecystokinin-B receptor
 Length = 450

Score = 101 bits (251), Expect = 3e-21
 Identities = 65/96 (67%), Positives = 69/96 (71%), Gaps = 9/96 (9%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGA-----VHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGLRF D+DSD+QSRVRNQGGLP VHQNG CR T A GED+DGCYVQL
 Sbjct: 243 RELYLGLRFDGNDSDTQSRVRNQGGLPGGTAPGVPVHQNGGCRHVTVA-GEDNDGCVVQL 301


Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVR 89
 PRSR + PGP S QAKLLAKKRVR
 Sbjct: 302 PRSRLEMTTLTPTPGPGLAS-ANQAKLLAKKRVR 336

gi|1813459|gb|AAB41676.1| gastrin/cholecystokinin receptor
 Length = 296

Score = 99.8 bits (247), Expect = 8e-21
 Identities = 65/96 (67%), Positives = 69/96 (71%), Gaps = 9/96 (9%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGA----VHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGLRF D+DSD+QSRVRNQGGLPG VHONG CR T A GED+DGCYVQL
 Sbjct: 99 RELYLGLRFDGDNDSDTQSRVRNQGGLPGGTAPGPHQNGGCRHVTVA-GEDNDGCVVQL 157




Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
 PRSR + PGP S QAKLLAKKRVVR
 Sbjct: 158 PRSRLEMTTLTTPTPGPGLAS-ANQAKLLAKKRVVR 192

 >gi|1813447|gb|AAB41829.1| gastrin/cholecystokinin receptor
 Length = 316

Score = 97.8 bits (242), Expect = 3e-20
 Identities = 64/96 (66%), Positives = 68/96 (70%), Gaps = 9/96 (9%)

Query: 1 RELYLGLRF--DSDSDSQSRVRNQGGLPGA----VHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGLRF D+DSD+QSRVRN GGLPG VHONG CR T A GED+DGCYVQL
 Sbjct: 111 RELYLGLRFDGDNDSDTQSRVRNQGGLPGGTAPGPHQNGGCRHVTVA-GEDNDGCVVQL 169



Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
 PRSR + PGP S QAKLLAKKRVVR
 Sbjct: 170 PRSRLEMTTLTTPTPGPGLAS-ANQAKLLAKKRVVR 204

 >gi|6978617|ref|NP_037297.1|  cholecystokinin B receptor; CCK(B) receptor; CCK2
 norvegicus]
 gi|232132|sp|P30553|GASR_RAT Gastrin/cholecystokinin type B receptor (CCK-B recep
 gi|423801|pir|A46195 cholecystokinin B receptor subtype - rat
 gi|203460|gb|AAA40925.1|  cholecystokinin receptor
 Length = 452

Score = 95.9 bits (237), Expect = 1e-19
 Identities = 61/96 (63%), Positives = 65/96 (67%), Gaps = 7/96 (7%)

Query: 1 RELYLGLRFD--SDSDSQSRVRNQ----GGLPGAVHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGL FD +DS++QSR RNQ G PG VHONG CRP T GEDSDGC VQL
 Sbjct: 243 RELYLGLHFDGENDSETQSRARNQGGLPGGAAPGPHQNGGCRPVTSVAGEDSDGCCVQL 302


Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
 PRSR + PGP G RP QAKLLAKKRVVR
 Sbjct: 303 PRSRLEMTTLTTPTPGVPVGPVRPNQAKLLAKKRVVR 338

 >gi|1083622|pir|IS48049 cholecystokinin B receptor - rat (fragment)
 gi|558237|emb|CAA55798.1|  CCK(B) receptor [Rattus norvegicus]
 gi|31872397|gb|AAP59041.1| CCK2 receptor [Rattus norvegicus]
 Length = 381

Score = 91.7 bits (226), Expect = 2e-18
 Identities = 61/96 (63%), Positives = 65/96 (67%), Gaps = 7/96 (7%)

Query: 1 RELYLGLRFD--SDSDSQSRVRNQ----GGLPGAVHQNGRCRPETGAVGEDSDGCVVQL 53
 RELYLGL FD +DS++QSR RNQ G PG VHONG CRP T GEDSDGC VQL
 Sbjct: 172 RELYLGLHFDGENDSETQSRARNQGGLPGGAAPGPHQNGGCRPVTSVAGEDSDGCCVQL 231


Query: 54 PRSRPALELTALTAPGPGSGSRPTQAKLLAKKRVVR 89
PRSR + PGP G RP QAKLLAKKRVVR
Sbjct: 232 PRSRLEMTTLTPTPGFVPGPRPNQAKLLAKKRVVR 267

 >[gi|2495001|sp|P70031|CCKR_XENLA](#) Cholecystokinin receptor (CKK-XLR)
[gi|1572485|gb|AAB09052.1|](#) cholecystokinin receptor
Length = 453

Score = 62.0 bits (149), Expect = 2e-09
Identities = 32/93 (34%), Positives = 52/93 (55%), Gaps = 14/93 (15%)


Query: 1 RELYLGLRFDSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVQLPRSRPAL 60
RELY G++E+ D + +++ H+NG P T G++ DGCY+Q+ + R +
Sbjct: 261 RELYRGIQFEMDLNKEAK-----AHKNGVSTPTTIPSGDEGDGCVIQVTKRRNTM 310

Query: 61 ELTALTAPGPGSGSRP----TQAKLLAKKRVVR 89
E++ LT R ++AKL+AKKRV+R
Sbjct: 311 EMSTLTPSVCTKMDRARINNSEAKLMAKKRVIR 343

 >[gi|26333421|dbj|BAC30428.1|](#) unnamed protein product [Mus musculus]
Length = 314

Score = 52.0 bits (123), Expect = 2e-06
Identities = 28/39 (71%), Positives = 29/39 (74%), Gaps = 5/39 (12%)


Query: 1 RELYLGLRFDSDSDS--QSRVRNQGGLPGAVHQ---NGR 34
RELYLGLRFD D+DS QSRVRNQGGLP NGR
Sbjct: 243 RELYLGLRFDGDNDSETQSRVRNQGGLPGGAAAPDFNGR 281

 >[gi|2495000|sp|Q63931|CCKR_CAVPO](#) Cholecystokinin type A receptor (CKK-A receptor)
[gi|2147182|pir||I51898](#) cholecystokinin A receptor - guinea pig
[gi|544724|gb|AAB29504.1|](#) cholecystokinin A receptor; CKK-A receptor [Cavia]
Length = 430

Score = 51.6 bits (122), Expect = 3e-06
Identities = 34/96 (35%), Positives = 46/96 (47%), Gaps = 23/96 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVG--EDSDGCVQLPRSRPA 59
ELY G++FD+ ++ R + TG+ G EDSGDCY+Q R
Sbjct: 235 ELYQGIKFDAIQKSAKER-----KTSTGSSGPMEDSDGCVLQKSRHPRK 279




Query: 60 LELTALTAPGPGSG-----SRPTQAKLLAKKRVVR 89
LEL L+ GS S + A L+AKKRV+R
Sbjct: 280 LELQLSPSSSGSNRINRIRSSSTANLMAKKRVIR 315

 >[gi|739858|prf||2004206A](#) cholecystokinin A receptor
Length = 450

Score = 51.2 bits (121), Expect = 3e-06
Identities = 34/96 (35%), Positives = 46/96 (47%), Gaps = 23/96 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVG--EDSDGCVYQLPRSRPA 59
 ELY G++FD+ ++ R + TG+ G EDSDGCV+Q R
 Sbjct: 255 ELYQGIKFDAIQKSAKER-----KTSTGSSGPMEDSDGCVLQKSRHPRK 299

Query: 60 LELTALTAPGPGSG-----SRPTQAKLLAKKRVVR 89
 LEL L+ GS S + A L+AKKRV+R
 Sbjct: 300 LELRQLSPSSSGSNRINRIRSSSSTANLMAKKRVIR 335

>gi|6978615|ref|NP_036820.1|  cholecystokinin A receptor [Rattus norvegicus]
 gi|231713|sp|P30551|CKKR RAT Cholecystokinin type A receptor (CCK-A receptor) (CC
 gi|285238|pir|I42685 cholecystokinin receptor type A - rat
 gi|203384|qb|AAA40899.1|  cholecystokinin receptor
 gi|1100753|dbj|BAA09170.1|  cholecystokinin type-A receptor [Rattus norvegicus]
 Length = 444

Score = 50.8 bits (120), Expect = 4e-06
 Identities = 33/95 (34%), Positives = 47/95 (49%), Gaps = 22/95 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVG--EDSDGCVYQLPRSRPA 59
 ELY G++FD+ ++ + +P TG+ EDSDGCV+Q R
 Sbjct: 250 ELYQGIKFASQKSAKEK-----KPSTGSSTRYEDSDGCVLQKSRPFRK 294







Query: 60 LELTALTAPGPGSG-----GSRPTQAKLLAKKRVVR 89
 LEL L++ GS S + A L+AKKRV+R
 Sbjct: 295 LELQLSSGSGSRLNRISSSSAANLIAKKRVIR 329

>gi|1582179|prf|I2118221A cholecystokinin A receptor
 Length = 428

Score = 49.7 bits (117), Expect = 1e-05
 Identities = 34/97 (35%), Positives = 47/97 (48%), Gaps = 27/97 (27%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVG--EDSDGCVYQLPRSRPA 59
 ELY G++F++ ++ R +P T + G EDSDGCV+Q R
 Sbjct: 235 ELYQGIKFEASQKSAKER-----KPSTSSGKYEDSDGCVLQKTRPFRK 279

Query: 60 LELTALTAPGPGSGSRPTQ-----AKLLAKKRVVR 89
 LEL L+ GS SR + A L+AKKRV+R
 Sbjct: 280 LELRQLST---GSSSRANRIRSNSSAANLMAKKRVIR 313

>gi|4502607|ref|NP_000721.1|  cholecystokinin A receptor [Homo sapiens]
 gi|416772|sp|P32238|CKKR HUMAN  Cholecystokinin type A receptor (CCK-A receptor)
 gi|484443|pir|JN0692 cholecystokinin type A receptor - human
 gi|306491|qb|AAA35659.1|  cholecystokinin A receptor
 gi|306596|qb|AAA02819.1|  cholecystokinin A receptor
 gi|1209500|qb|AAA91123.1|  cholecystokinin type A receptor
 gi|7008027|dbj|EAA90879.1| cholecystokinin type-A receptor [Homo sapiens]
 gi|32482019|qb|AAP84362.1|  cholecystokinin A receptor [Homo sapiens]
 Length = 428

Score = 49.7 bits (117), Expect = 1e-05
Identities = 34/97 (35%), Positives = 47/97 (48%), Gaps = 27/97 (27%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVG--EDSDGCVYQLPRSRPA 59
ELY G++F++ ++ R +P T + G EDSGCVY+Q R
Sbjct: 235 ELYQGIGKFEASQKKSAKER-----KPSTTSSGKYEDSDGCVLQKTRPPRK 279

Query: 60 LELTALTAPGPGSGSRPTQ-----AKLLAKKRVVR 89
LEL L+ GS SR + A L+AKKRV+R
Sbjct: 280 LELRQLST---GSSSRANRIRSNSSAANLMAKKRVIR 313

>gi|2541920|dbj|BAA22847.1| cholecystokinin type-A receptor [Rattus norvegicus]
Length = 307

Score = 49.3 bits (116), Expect = 1e-05.
Identities = 33/95 (34%), Positives = 47/95 (49%), Gaps = 22/95 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVG--EDSDGCVYQLPRSRPA 59
ELY G++FD+ ++ + +P TG+ EDSGCVY+Q R
Sbjct: 113 ELYQGIGKFASQKKSACEK-----KPSTGSSTRYEDSDGCVLQKSRPPRK 157

Query: 60 LELTALTAPGPGS----GSRPTQAKLLAKKRVVR 89
LEL L++ GS S + A L+AKKRV+R
Sbjct: 158 LELQLSSSGSGSRLNIRIRSSSSAANLIAKKRVIR 192

>gi|32400155|emb|CAD33800.1| cholecystokinin receptor [Gallus gallus]
Length = 436

Score = 47.0 bits (110), Expect = 7e-05
Identities = 34/93 (36%), Positives = 47/93 (50%), Gaps = 19/93 (20%)

Query: 1 RELYLGLRFDSDSDSQSRV-RNQGLPGAVHQNGRCRPETGAVGEDSDGCVYQLPRSRPA 59
RELY G+RF+ D ++ R+ LP ++ DGCVY+QL R A
Sbjct: 250 RELYRGIRFELDIKGEAAQ RSTPLPTC-----DEGDGCVLQLSRPGGA 294

Query: 60 LELTALTAPGPGSGS---RPTQAKLLAKKRVVR 89
LEL AL A G ++AKL+AK+RV+R
Sbjct: 295 LELRALGAAGAQQERARINSSEAKLVAKRVIR 327

>gi|12836122|dbj|BAB23512.1| unnamed protein product [Mus musculus]
Length = 436

Score = 46.2 bits (108), Expect = 1e-04
Identities = 31/93 (33%), Positives = 43/93 (46%), Gaps = 11/93 (11%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGLPGAVHQNGRCRPETGAVGEDSDGCVYQLPRSRPALE 61
ELY G++FD+ ++ + G + R EDSGCVY+Q R LE
Sbjct: 235 ELYQGIGKFASQKKSACEKRLSSGGGGGSSSSRY-----EDSDGCVLQKSRPPRKLE 288

Query: 62 LTALTAPGPGS----GSRPTQAKLLAKKRVVR 89
L L+ G S + A L+AKKRV+R
Sbjct: 289 LQQLSTSSSGGRINRIRSSGSAANLIAKKRVIR 321

>gi|6753306|ref|NP_033957.1| cholecystikinin A receptor [Mus musculus]
 gi|6225102|sp|O08786|CKKR MOUSE Cholecystikinin type A receptor (CCK-A receptor
 gi|7438588|pir|JC5599 cholecystikinin-A receptor - mouse
 gi|2114152|dbj|BAA20068.1| cholecystikinin type-A receptor [Mus musculus]
 gi|2984512|gb|AAC07949.1| cholecystikinin-A receptor [Mus musculus]
 Length = 436

Score = 45.8 bits (107), Expect = 1e-04

Identities = 31/93 (33%), Positives = 43/93 (46%), Gaps = 11/93 (11%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGGLPQAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALE 61
 ELY G++FD+ ++ + G + R EDSGCVY+Q R LE
 Sbjct: 235 ELYQGIKFDASQKSAKEKRLSSGGGGGGSSSSRY-----EDSDGCVLQKSRPPRKLE 288
 Query: 62 LTALTAPGPGS-----GSRPTQAKLLAKKRVR 89
 L L+ G S + A L+AKKRV+R
 Sbjct: 289 LQQLSTSSSGGRINRIRSSGSAANLIAKKRVIR 321

>gi|18088214|gb|AAH20534.1| cholecystikinin A receptor [Mus musculus]
 Length = 436

Score = 45.8 bits (107), Expect = 1e-04

Identities = 31/93 (33%), Positives = 43/93 (46%), Gaps = 11/93 (11%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGGLPQAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPALE 61
 ELY G++FD+ ++ + G + R EDSGCVY+Q R LE
 Sbjct: 235 ELYQGIKFDASQKSAKEKRLSSGGGGGGSSSSRY-----EDSDGCVLQKSRPPRKLE 288
 Query: 62 LTALTAPGPGS-----GSRPTQAKLLAKKRVR 89
 L L+ G S + A L+AKKRV+R
 Sbjct: 289 LQQLSTSSSGGRINRIRSSGSAANLIAKKRVIR 321

>gi|1083155|pir|IS50150 gastric CCK-A receptor - rabbit
 gi|896235|gb|AAB32223.1| cholecystikinin receptor subtype A, CCK-A receptor=G pro
 coupled receptor [rabbits, fundic epithelium, Peptide,
 427 aa]
 gi|1091571|prf||2021259A cholecystikinin A receptor
 Length = 427

Score = 43.1 bits (100), Expect = 0.001

Identities = 36/94 (38%), Positives = 49/94 (52%), Gaps = 22/94 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGGLPQAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPA-- 59
 ELY G++FD+ ++ R A +GR ED+DGCY+Q RS+P
 Sbjct: 235 ELYQGIKFDASQKSAKERK-----ASTGSGRF-----EDNDGCVLQ--RSKPTRQ 278
 Query: 60 LELTALTAPGPGSGSR----PTQAKLLAKKRVR 89
 LEL L+ G G SR + A L+AKKRV+R
 Sbjct: 279 LELQLSGGGGGRVSRHSSSSAAALMAKKRVIR 312

>gi|10719928|sp|O97772|CCKR_RABIT Cholecystokinin type A receptor (CCK-A recepto
gi|4295090|gb|AAD11547.1| gastric cholecystokinin A receptor [Oryctolagus cunicul
Length = 427

Score = 41.6 bits (96), Expect = 0.003
Identities = 33/94 (35%), Positives = 46/94 (48%), Gaps = 22/94 (23%)

Query: 2 ELYLGLRFDSDSDSQSRVRNQGGLPGAVHQNGRCRPETGAVGEDSDGCVVQLPRSRPA-- 59
ELY G++FD+ ++ R A +GR ED+DGCY+Q RS+P
Sbjct: 235 ELYQGIKFASQKKSARKERK-----ASTGSGRF-----EDNDGCYLQ--RSKPTRQ 278

Query: 60 LELTALT---APGPGSGSRPTQAKLLAKKRVVR 89
LEL L+ S + A L+AKKRV+R
Sbjct: 279 LELQLSGGGGGRVSRIRSSSSAATLMAKKRVIR 312

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Database: All non-redundant GenBank CDS
translations+PDB+SwissProt+PIR+PRF
Posted date: Sep 26, 2003 1:54 AM
Number of letters in database: 497,353,198
Number of sequences in database: 1,538,680

Lambda	K	H
0.314	0.135	0.395

Gapped		
Lambda	K	H
0.267	0.0410	0.140

Matrix: BLOSUM62
Gap Penalties: Existence: 11, Extension: 1
Number of Hits to DB: 24,766,440
Number of Sequences: 1538680
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Number of successful extensions: 1602
Number of sequences better than 10.0: 10
Number of HSP's better than 10.0 without gapping: 9
Number of HSP's successfully gapped in prelim test: 3
Number of HSP's that attempted gapping in prelim test: 1576
Number of HSP's gapped (non-prelim): 15
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length of database: 497,353,198
effective HSP length: 65
effective length of query: 24
effective length of database: 397,338,998
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effective search space used: 9536135952
T: 11
A: 40
X1: 16 (7.3 bits)
X2: 38 (14.6 bits)
X3: 64 (24.7 bits)
S1: 42 (21.9 bits)

S2: 66 (30.0 bits)

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[Stoffel, R. H.](#) , [Randall, R. R.](#) , [Premont, R. T.](#) , [Lefkowitz, R. J.](#) ,
[Inglese, J.](#)

Howard Hughes Medical Institute, Duke University
Medical Center, Durham, North Carolina 27710.

GRK6, a 66-kDa serine/threonine protein kinase, is a recently identified member of the G protein-coupled receptor kinase (GRK) family. GRKs are involved in the phosphorylation of seven-transmembrane receptors, a process mediating desensitization of signal transduction. An important feature of these enzymes is their membrane-associated nature, which for some members is stimulus-dependent. The structural basis for this membrane association previously has been shown in different members of the GRK family to include isoprenylation, G protein beta gamma-binding domains, and basic regions to provide electrostatic interactions with phospholipids. We provide evidence that another mechanism includes fatty acid acylation. GRK6, but not other GRKs tested, incorporated tritium after incubation with [3H]palmitate in Sf9 and in COS-7 cells overexpressing the kinase. The incorporated radioactivity was released from the protein by neutral hydroxylamine, indicating the presence of a thioester bond, and was confirmed as palmitic acid by high performance liquid chromatography analysis. Site-directed mutagenesis defined the region of palmitate attachment as a cluster of 3 cysteines (Cys561, Cys562, and Cys565) in the carboxyl-terminal domain of the kinase, consistent with the location of the membrane targeting domains

of GRKs 1, 2, 3, and 5. Palmitoylation of GRK6 appears essential for membrane association, since palmitoylated kinase was found only in the membrane fraction. This lipid modification provides a structural basis for potential regulation of the subcellular distribution of GRK6 through acylation/deacylation cycles.

MedlineID: 95050538

PMID: 7961702

ISSN: 0021-9258

Publication Type:
Journal Article

Substances:

Palmitic Acids

Plasmids

Potassium Channels

delayed rectifier potassium channel

Cysteine

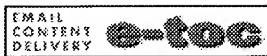
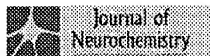
Palmitic Acid

G-protein-coupled receptor kinase 6

Receptor Protein-Tyrosine Kinases

GTP-Binding Proteins

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REGULAR ARTICLES

The metabotropic glutamate receptor mGluR4, but not mGluR1 alpha, is palmitoylated when expressed in BHK cells

S Alaluf, ER Mulvihill and RA McIlhinney

Medical Research Council Anatomical Neuropharmacology Unit, Oxford, England.

Several G protein-coupled receptors have been shown to be palmitoylated, and for some of these receptors the covalent attachment of palmitate has been implicated in the regulation of receptor-G protein coupling. The metabotropic glutamate receptor (mGluR) family forms a distinct group of G protein-coupled receptors, and the possibility that these may also be palmitoylated has been examined. Clonal baby hamster kidney (BHK) cells permanently transfected with the mGluR4 and mGluR1 alpha subtypes were labelled with [3H]palmitic acid. The cells were lysed, the receptors were immunoprecipitated with specific antipeptide antibodies, and the immunoprecipitates were analysed by sodium dodecyl sulphate-polyacrylamide gel electrophoresis and autoradiography. The palmitoylated, endogenously expressed G protein alpha-subunit alpha q could be immunoprecipitated from [3H]palmitate-labelled BHK cells expressing mGluR1 alpha using a specific antipeptide antibody, but in the same cell lysates no detectable [3H]palmitate-labelled mGluR1 alpha was found. This suggests that this mGluR subtype, associated with stimulation of phospholipase C, is not palmitoylated. In contrast, mGluR4, which is coupled to inhibition of adenylyl cyclase, was found to be labelled with [3H]palmitic acid, and the palmitate was quantitatively removed by treatment with 1 M hydroxylamine, suggesting attachment of the palmitate through a thioester bond. Stimulation with maximal doses of the neurotransmitter glutamate for 1, 5, or 10 min appeared to have no effect on the level of receptor palmitoylation.

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J. Biol. Chem., August 22, 1997; 272(34): 21589 - 21596.

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